Oral Corticosteroid Use for Loss of Flexion After Primary Anterior Cruciate Ligament Reconstruction

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Purpose: Postoperative loss of motion after anterior cruciate ligament (ACL) reconstruction can lead to suboptimal outcomes. Short-term low-dose oral corticosteroids are an option for nonsurgical management of this condition. The purpose of this study is to retrospectively review a series of patients treated with a single Medrol Dosepak (MDP) (Pfizer, New York, NY) in the early postoperative period for the treatment of loss of flexion, focusing on range of motion, objective instrumented stability measurements, and complications. **Methods:** From September 1, 2003, through January 1, 2007, 28 (11%) of 252 patients who underwent primary ACL reconstruction were treated with an MDP at a mean of 6.1 weeks postoperatively (range, 4 to 12 weeks; SD, 1.4 weeks) for early postoperative loss of motion. Of these 28 patients, 4 were not included because of unavailable clinical records. One patient who underwent combined ACL and posterior cruciate ligament reconstruction with medial collateral ligament repair was excluded from the analysis. Range-of-motion and KT-1000 (MEDmetric, San Diego, CA) measurements were independently recorded by a single examiner preoperatively, at 6 weeks postoperatively, and again at final follow-up evaluation at a mean of 10.4 months (range, 4 to 24 months; SD, 4.3 months). **Results:** The mean flexion deficit compared with the normal, contralateral knee at the time of treatment with an MDP was 31.3° (range, −2° to 55°; SD, 14.8°). Patients treated with an MDP showed a significant improvement in flexion deficit (mean, 29.2°; range, 0° to 60°; SD, 17.1°) after MDP treatment ($P < .001$). KT-1000 side-to-side differences at final examination were 2 mm or less in 22 of 23 patients (mean, 1 mm; range, 0 to 4 mm; SD, 1 mm). Of the 23 patients treated with an MDP, 5 (22%) were considered failures because they required surgical intervention for persistent loss of motion, resulting in a reoperation rate for loss of motion after primary ACL reconstruction of 2.0% (5/252). There were no documented complications of MDP treatment. Specifically, no patients treated with an MDP had a postoperative infection develop. **Conclusions:** The use of oral corticosteroids, in the form of an MDP, was associated with a successful return of normal range of motion in 78% of patients with early postsurgical loss of flexion and near-normal extension after primary ACL reconstruction without any associated complications or decrease in objective instrumented stability measurements. **Level of Evidence:** Level IV, therapeutic case series. **Key Words:** Anterior cruciate ligament—Reconstruction—Loss of motion—Oral corticosteroid—Range of motion—KT-1000.

After anterior cruciate ligament (ACL) reconstruction, regaining adequate knee range of motion (ROM) is critical to subjective and objective patient outcomes. Loss of motion after ACL reconstruction is a well-recognized complication, with a reported incidence ranging from 2% to as high as 59%.[1-3] A commonly encountered situation is a loss of full extension resulting from mechanical impingement of structures anterior to the graft. It has been suggested that when the postoperative knee has not been fully extended for a period of time, fibroproliferative nodules of granulation tissue may form and block terminal extension.[4,5] Loss of flexion is associated with a diffuse scarring of the patellar tendon to the fat pad, formation of adhesions in the gutters, and capsular contractures likely due to postoperative capsulitis.[6]

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Inability to regain full extension is typically more symptomatic because of the added stress on the extensor mechanism while standing.[4] Patellofemoral pain, quadriceps muscle weakness, accelerated articular degeneration, and overall poor knee function have been correlated with the inability to regain full extension.[2] Factors that may place a patient at higher risk for postoperative loss of motion include lack of full ROM preoperatively, surgery within 3 weeks of injury, prolonged immobilization, infection, inadequate notchplasty, graft malpositioning, cyclops lesion, infrapatellar fat pad contracture syndrome, reflex sympathetic dystrophy, or multiligament injury.[2,4,5,7-10]

Management of loss of motion depends largely on the degree of limitation in ROM and time from surgery.[11] In the early postoperative period, nonoperative modalities such as aggressive physical therapy with extension-board and prone-hang exercises, as well as extension casts, may be beneficial. In addition, ice and anti-inflammatory medications or oral methylprednisolone[12] in the form of a Medrol Dosepak (MDP) (Pfizer, New York, NY), containing 84 mg of methylprednisolone, are often used in conjunction with aggressive physical therapy because the knee may still be in the inflammatory phase of healing.[5] Traumatic manipulation and surgical lysis of adhesions are not recommended during this phase because the added tissue insult may lead to increased scar formation. Intra-articular steroid injections for treatment of pain and decreased motion have been described in the setting of chronic shoulder pain and arthrofibrosis of the shoulder resulting from adhesive capsulitis.[13] However, because of the concern regarding postoperative infection, intra-articular injections are generally avoided in our postoperative patients.

These nonoperative modalities may be efficacious in reducing the production of fibrous scar tissue. If full ROM is not regained by 3 months after surgery, nonoperative therapy is unlikely to be successful and operative intervention is indicated.[2,7] Surgical options include open or arthroscopic lysis of adhesions, resection of cyclops lesions, or possibly, ACL graft resection if malpositioned.[2,5,14]

Despite their common usage, to our knowledge, there is no report in the literature documenting the efficacy of oral corticosteroids for the treatment of loss of motion in the knee after ACL reconstruction in the early postoperative period. Furthermore, there is conflicting evidence with regard to the risks associated with the use of a short course of low-dose corticosteroids such as the MDP.[12,15-18]

The purpose of this study is to retrospectively review a series of patients treated with a single MDP in the early postoperative period for the treatment of loss of motion, focusing on ROM, objective instrumented stability measurements, and complications, to evaluate our hypothesis that oral corticosteroids are a safe and effective treatment for early postoperative loss of motion after ACL reconstruction.

METHODS

After appropriate institutional review board approval was obtained from our institution, a review of the senior author's surgical case log from September 1, 2003, through January 1, 2007, revealed 252 patients who underwent primary ACL reconstruction, including 123 bone–patellar tendon–bone autografts (48.8%), 116 bone–patellar tendon–bone allografts (46.0%), 11 hamstring allografts (4.4%), 1 hamstring autograft (<1%), and 1 Achilles tendon allograft (<1%). Of these patients, 28 (11%) were treated with a single MDP for postoperative loss of motion after ACL reconstruction.

The criterion for prescribing an MDP, containing a total dose of 84 mg of methylprednisolone given as a tapered dose over a period of 6 days, was failure to achieve full ROM equal to the patient's contralateral knee by the 6-week postoperative follow-up visit. In general, we defined an "at-risk" patient as one who had more than a 3° extension deficit and had less than 100° of flexion at this time interval. The mean time from ACL reconstruction to MDP administration was 6.1 weeks (range, 4 to 12 weeks; SD, 1.4 weeks).

Of the 28 patients, 4 were not included in the final analysis because of unavailable clinical records. One patient who underwent combined ACL and posterior cruciate ligament reconstruction with medial collateral ligament repair was excluded from the analysis. A retrospective chart review was performed. Goniometric ROM and KT-1000 (MEDmetric, San Diego, CA) measurements were independently recorded by a single examiner preoperatively, at the 6-week postoperative examination, and again at the most recent evaluation and were compared with the patient's normal, contralateral knee. Any associated complications or infections and further interventions such as subsequent surgical procedures were also documented.

The demographics of the group are listed in Table 1. Reconstruction with bone–patellar tendon–bone autograft was done in 16 patients (70%), and reconstruction with bone–patellar tendon–bone allograft was done in 7 (30%). Of the 23 patients, 14 (61%) had